Exhibit R-2, PB 2010 Navy RDT&E Budget Item Justification									DATE: May 2009	
APPROPRIATION/BUDGET ACTIVITY 1319 - Research, Development, Test & Evaluation, Navy/BA 3 - Advanced Technology Development (ATD)					R-1 ITEM NOMENCLATURE PE 0603236N WARFIGHTER SUSTAINMENT ADVANCED TECHNOLOGY					
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
Total Program Element	90.353	137.458	86.239						Continuing	Continuing
2915: WARFIGHTER SUSTAINMENT ADVANCED TECHNOLOGY	80.005	112.167	86.239						Continuing	Continuing
9999: CONGRESSIONAL PLUS-UPS	10.348	25.291	0.000						Continuing	Continuing

A. Mission Description and Budget Item Justification

The efforts described in this Program Element (PE) are based on investment directions as defined in the Naval Science and Technology (S&T) Strategic Plan approved by the S&T Corporate Board (Jan 2007). This strategy is based on needs and capabilities from Navy and Marine Corps guidance and input from the Naval Research Enterprise (NRE) stakeholders (including the Naval enterprises, the combatant commands, the Chief of Naval Operations (CNO), and Headquarters Marine Corps). It provides the vision and key objectives for the essential S&T efforts that will enable the continued supremacy of U.S. Naval forces in the 21st century. The Strategy focuses and aligns Naval S&T with Naval missions and future capability needs that address the complex challenges presented by both rising peer competitors and irregular/asymmetric warfare.

Warfighter Sustainment Advanced Technology supports: Manpower and Personnel, Training, and Readiness; and the Future Joint Warfighting Capabilities identified by the Joint Chiefs of Staff. It supports Future Naval Capabilities (FNC) Programs in Airframe/Ship Corrosion; Turbine Engine Technologies; Littoral Combat; Sea Base Planning, Operations and Logistics; and Sea Base Mobility and Interfaces. It develops technologies that enable the Navy to better recruit, select, classify, assign, and manage its people; to train effectively and affordably in classroom settings, in simulated and actual environments, and while deployed; and to effect human systems integration into weapon systems. Other technologies enable reduced operating costs through life-extension of legacy systems and increased efficiency of future propulsion systems and improved diagnostic tools.

Within the Naval Transformation Roadmap, this investment supports the achievement of all the transformational capabilities of Sea Warrior and the transformational capabilities of: Ship to Objective Maneuver and Time Sensitive Strike required by Sea Strike; Littoral Sea Control and Anti-Sub Warfare required by Sea Shield; Compressed Deployment and Employment Times and Enhanced Sea-Borne Positioning of Assets required by Sea Basing; and Battlespace Integration required by FORCEnet.

Due to the number of efforts in this PE, the programs described herein are representative of the work included in this PE.

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B. Program Change Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011
Previous President's Budget	101.007	112.520	101.051	
Current BES/President's Budget	90.353	137.458	86.239	
Total Adjustments	-10.654	24.938	-14.812	
Congressional Program Reductions		-0.373		
Congressional Rescissions				
Total Congressional Increases		25.360		
Total Reprogrammings	-10.000			
SBIR/STTR Transfer	-0.654			
Program Adjustments			-14.856	
Rate/Misc Adjustments		-0.049	0.044	

Congressional Increase Details ($ in Millions)	FY 2008	FY 2009
Project: 9999, **CHAFING PROTECTION SYSTEM**	0.000	1.197
Project: 9999, **DEFENSE MODERNIZATION AND SUSTAINMENT INITIATIVE**	0.000	4.986
Project: 9999, **DESKTOP VIRTUAL TRAINER FOLLOW-ON**	0.000	2.394
Project: 9999, **DOMAIN SPECIFIC KNOWLEDGE CAPTURE INTERFACE**	0.000	1.356
Project: 9999, **ENVIRONMENTALLY-SEALED RUGGEDIZED AVIONICS DISPLAYS FOR VERTICAL LIFT SYSTEM**	1.548	3.988
Project: 9999, **INTELLIGENT WORK MANAGEMENT FOR CLASS SQUADRONS (CLASSRONS)**	0.000	1.995
Project: 9999, **LITTORAL COMBAT SHIP (LCS) NETWORKED TACTICAL TRAINING SYSTEM (NTTS)**	0.965	0.000
Project: 9999, **NADEP CHERRY POINT CENTER FOR VERTICAL LIFT - INSTITUTE FOR MAINTENANCE SCIENCE AND TECHNOLOGY**	2.332	0.000
Project: 9999, **NATIONAL CENTER FOR RESEARCH ON EVALUATION, STANDARDS, AND STUDENT TESTING (CRREST) SKILL SET ANALYSIS**	2.314	0.000
Project: 9999, **PREDICTING BIO-AGENT THREAT PROFILES USING AUTOMATED BEHAVIOR ANALYSIS**	0.000	1.596
Project: 9999, **PROTECTIVE APPAREL TECHNOLOGY SYSTEMS**	0.771	0.000

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Congressional Increase Details ($ in Millions)	FY 2008	FY 2009
Project: 9999, **SEA BASE MOBILITY AND INTERFACES**	0.000	4.986
Project: 9999, **SYSTEM FOR INTELLIGENT TASK ASSIGNMENT & READINESS (SITAR)**	0.000	0.798
Project: 9999, **VALIDATION OF LIFT FAN ENGINE SYSTEMS**	2.418	1.995

Change Summary Explanation

Technical: FY 2009 and out reflects a correction to the Seabasing INP funding profile to be consistent with the changes in complexity and cost associated with going from preliminary design and model development through prototype fabrication.

Schedule: Not applicable

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APPROPRIATION/BUDGET ACTIVITY 1319 - Research, Development, Test & Evaluation, Navy/BA 3 - Advanced Technology Development (ATD)				R-1 ITEM NOMENCLATURE PE 0603236N WARFIGHTER SUSTAINMENT ADVANCED TECHNOLOGY					PROJECT NUMBER 2915	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
2915: WARFIGHTER SUSTAINMENT ADVANCED TECHNOLOGY	80.005	112.167	86.239						Continuing	Continuing

A. Mission Description and Budget Item Justification

Warfighter Sustainment Advanced Technology supports Manpower and Personnel, Training, and Readiness; and the Future Joint Warfighting Capabilities identified by the Joint Chiefs of Staff. This project supports FNC Programs in Airframe/Ship Corrosion; Turbine Engine Technologies; Littoral Combat; Sea Base Planning, Operations and Logistics; and Sea Base Mobility and Interfaces. This project develops technologies that enable the Navy to better recruit, select, classify, assign, and manage its people; to train effectively and affordably in classroom settings, in simulated and actual environments, and while deployed; and to effect human systems integration into weapon systems. Other technologies enable reduced operating costs through life-extension of legacy systems, increased efficiency of future propulsion systems and improved diagnostic tools. Within the Naval Transformation Roadmap, this investment supports the achievement of all the transformational capabilities of Sea Warrior and the transformational capabilities of Ship to Objective Maneuver and Time Sensitive Strike required by Sea Strike; Littoral Sea Control and Anti-Submarine Warfare (ASW) required by Sea Shield; Compressed Deployment and Employment Times and Enhanced Sea-Borne Positioning of Assets required by Sea Basing; and Battlespace Integration required by FORCEnet.

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
AIRFRAME/SHIP CORROSION/COST REDUCTION TECHNOLOGIES	2.455	2.895	4.668	
This activity includes an integrated approach for the control of the effects of external and internal corrosion in Naval weapon systems as well as cost reduction technology efforts. The work develops advanced, cost effective prevention and lifecycle management technologies. This is particularly significant to life extension for the aging fleet. The funding profile from FY 2008 to FY 2009 reflects the reorganization of the FNC Program investments into EC's. The funding increase from FY 2009 to FY 2010 is due to the initiation and ramp-up of several new EC's including corrosion related signature technologies and advanced shipboard water desalination and corrosion.				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
FY 2008 Accomplishments: - Continued Nondestructive Inspection (NDI) technology for heat damage detection on composite materials. - Initiated development on improved non-skid coatings. - Initiated development on improved ship rudder coatings. - Initiated development on high performance topside coatings - Initiated development on high performance airfield pavements. *FY 2009 Plans:* - Continue all efforts of FY 2008. - Initiate evaluation of advanced material coatings for erosion control on helicopter main rotor blade leading edges. *FY 2010 Plans:* - Continue all effort of FY 2009. - Complete evaluation of advanced materials for erosion control on helicopter main rotor blade leading edges. - Initiate down select of materials for erosion control of helicopter main rotor blade leading edges for subsystem evaluation of performance. - Initiate evaluation and correlation of materials repair technologies related to sub-system materials for erosion control on helicopter main rotor blade leading edges. - Initiate evaluation, design and demonstration of advanced ASGS (Active Shaft Grounding System) with Condition Based Maintenance (CBM) and signature control. - Initiate evaluation, design, large scale testing and demonstration of Impressed Current Cathodic Protection (ICCP) components. - Initiate evaluation, design and demonstration of dual-use ICCP and novel sensor technology for CBM and closed-loop deamping. - Initiate testing and evaluation of diagnostic models and demonstration of materials with improved barrier dielectrics.				

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B. Accomplishments/Planned Program ($ in Millions)		**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
- Initiate evaluation, testing and demonstration of CBM underwater hull analysis model integrated with closed loop deamping model.					
FRICTION DRAG REDUCTION This activity is a collaborative effort with the Defense Advanced Research Agency (DARPA) and the Program Executive Officer for Ships (PEO Ships). The objective is to unambiguously demonstrate the performance of large-scale predictive models that incorporate sufficient physics from first-principles models on a large or full-scale ship test vehicle. FY 2008 - 2009 funding profile reflects the phased completion of the Friction Drag Reduction program at the end of FY 2009. *FY 2008 Accomplishments:* - Initiated design of large-scale demonstrator; modify demonstrator to install drag reduction equipment and sensors. - Initiated at-sea large-scale demonstrator test. - Initiated design of an optimal implementation of additive-based drag reduction technology using large-scale predictive models. *FY 2009 Plans:* - Complete large-scale flat-plate test and data reduction.		2.436	1.206	0.000	
HUMAN SYSTEMS INTEGRATION This effort supports the warfighter by providing enhanced capabilities by designing affordable user-centered systems that are efficient, easy to use, and provide required mission capabilities at lowest lifecycle costs. Such systems will be optimally designed for the right number and types of personnel, requiring minimum training while providing high skills retention. This field of research is paramount to the reduction in complex naval systems design, acquisition, operation, and maintenance costs and improvements in the effectiveness of operations. Congressional,		3.841	4.898	6.137	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
DoD, and Navy policies and instructions require Navy and Marine Corps Program Managers to have a comprehensive plan for Human Systems Integration (HSI) in the acquisition process to optimize total system performance, minimize total ownership costs, and ensure the system is built to accommodate the characteristics of the user population that will operate, maintain, and support the systems. A strong HSI effort is required to meet these goals. The funding increase from FY 2008 to FY 2009 supports research in commanding officer/crew decision making and studies for control and monitoring multiple unmanned vehicles. The increase in funding from FY 2009 to FY 2010 supports research into mission performance optimization encompassing task centered design and advanced human performance modeling and also research into improving delivery of sensor information to displays for enhanced understanding of uncertain information. *FY 2008 Accomplishments:* - Initiated research to develop and demonstrate automation and human interface technologies to support collaborative decision-making in which multiple unmanned system operators manage groups of vehicles with optimal manning. - Initiated research to develop and demonstrate advanced tactical decision making technologies to integrate spatially disparate displays and reduce the reliance of crew support to achieve superior ship commanding officer and crew decision making. - Initiated HSI interface display research to improve ships personnel's ability to efficiently and effectively detect, recognize, and identify noisy targets in ambiguous and uncertain dynamic environments. - Initiated HSI tool research, development, and application to engineering efforts to develop robust standardized set of human systems integrated specific modeling and simulation tools to assess the interaction between operators performance by system design by manning levels. *FY 2009 Plans:* - Continue all efforts of FY 2008. - Initiate experiments to study design issues related to simultaneous control and monitoring of a multiple unmanned surface and air vehicles. Of particular importance are issues monitoring and control of				

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B. Accomplishments/Planned Program ($ in Millions)		**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
multiple vehicles, planning and re-planning as environmental findings from sensors are interpreted, and safety and collision avoidance. *FY 2010 Plans:* - Continue all efforts of FY 2009. - Complete HSI interface display research to improve ships personnel's ability to efficiently and effectively detect, recognize, and identify noisy targets in ambiguous and uncertain dynamic environments. - Complete experiments to study design issues related to simultaneous control and monitoring of a multiple unmanned surface and air vehicles. - Initiate research into mission performance optimization encompassing task centered design and advanced human performance modeling for achieving the requisite manning, both in numbers and capabilities, for the complex ships and systems of the future fleet. - Initiate improving the capability to fuse imaging, electronic warfare, inorganic and acoustic sensor inputs into integrated, fused, and intuitive displays that enhance the presentation and command understanding of uncertain information.					
LITTORAL COMBAT The goal of Littoral Combat is the application of technologies to enhance the ability of the Navy/Marine Corps team to execute the Naval portion of a joint campaign in the littorals. This activity considers all the critical functions of warfighting: command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR), fires, maneuver, sustainment, force protection, and training. The activity includes support to the following FNC ECs; Battlefield Power, Reduced Support Costs 1, Advanced Naval Fires Technology Spiral 1, Combatant Commander (COCOM) to Marine Combat Identification (ID), Global Information Grid (GIG)-Compliant Networking, Hostile Fire Detection and Response Spiral 2, Position-Location-Information, Reduced Cost of Operations 1, Sea Base Collaborative Command and Control, Sea Base Mobility and Interfaces, and Sea Base Integrated Operations. The FY 2008 to FY 2009 increase reflects initiation of a new FNC effort to develop enhanced individual protective systems for the Warfighter. The increase in funding between FY 2009 and FY 2010 is due to		2.309	6.246	9.823	

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B. Accomplishments/Planned Program ($ in Millions)		**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
the initial funding of FNC efforts for advanced survivability and mobility for Marine Corps, and the initiation of new FNC efforts to reduce the load of dismounted combatants. *FY 2008 Accomplishments:* - Continued development of battlefield power generation technologies lunchbox sized 500 – 1000W portable JP-8 fueled generator. *FY 2009 Plans:* - Continue all efforts of FY 2008. - Initiate development of advanced lighter weight modular individual protective system that will provide increased flexibility and protection for the warfighter. (Concurrent effort funded by PE 0602131M and PE 0603640M). *FY 2010 Plans:* - Continue all efforts of FY 2009. - Complete development and transition advanced power generation technologies that enable reduction of the logistical burden on small tactical units. - Initiate development of advanced armor technologies for improved survivability and advanced suspension technologies for improved cross country mobility of Marine Corps tactical and combat vehicles.(Previous FY 2009 funding by PE 0602131M and 0603640M; concurrent funding by PE 0602131M and PE 0603640M- funding by these PEs completes development and transition). - Initiate development of individual warfighter lightweight protective system technologies that will reduce body armor weight, improve survivability and increase the mobility of the warfighter. (Concurrent funding provided by PE 0602236N) - Initiate research to develop technology to reduce fabrication and life cycle costs of SSN/SSGN next generation photonics mast and to improve SSN surface situational awareness through faster image acquisition rates, improve range performance under adverse weather conditions and improve autonomous detection and classification.(Concurrent funding provided by PE 0602236N).					
MANPOWER AND PERSONNEL DEVELOPMENT		5.196	5.229	5.157	

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B. Accomplishments/Planned Program ($ in Millions)		**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
This activity provides Navy personnel system managers with the ability to attract and retain the right people and to place them in jobs that best use their skills, training, and experience. Application of modeling and simulation, mathematical optimization, advanced testing, statistical forecasting, information visualization, data warehousing, data cleansing, web-based knowledge management, and human performance measurement technologies enhances Fleet readiness and reduces personnel costs. *FY 2008 Accomplishments:* - Initiated development and demonstration of decision support tools linked with Sea Warrior. - Initiated advanced selection, classification and assessment metrics to facilitate optimal labor substitution. - Initiated integration and multi-faceted decision support tools to evaluate manpower alternatives. - Initiated development and demonstration of behaviorally-based predictive models. *FY 2009 Plans:* - Continue all efforts of FY 2008. - Initiate experiments and demonstration of independent dynamic supply and demand models for Navy skill sets. - Initiate development of a prototype assessment measure of team adaptive performance. *FY 2010 Plans:* - Continue all efforts of FY 2009.					
SEA BASE MOBILITY AND INTERFACES This activity includes support for Sea Base Mobility and Interfaces and Force Closure. This activity improves the capability for transfer of cargo between Sea Base/Logistics vessels and employment of combat ready forces over unimproved beaches during high sea states. Capabilities being developed include propulsion technologies, maneuvering technologies, and advanced hull systems technologies needed for sustained operations at high speed in high sea states. This activity further supports the		15.647	23.977	7.676	

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B. Accomplishments/Planned Program ($ in Millions)		**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**

Seabasing mission of transporting troops, equipment, and materials from the seabase to shore, and providing support to seaborne forces via surface distribution interfaces.

FY 2008 - FY 2009 increase results from the planned initiation of projects to support the Navy's developing seabasing concept of operations, to support planned product transitions to new ship programs through land-based and at-sea demonstrations, and to reflect the realignment of FNC Program investments into ECs. Funding increases between FY 2008 and FY 2009 support several programs that are at the stage where the actual large-scale technology demonstration systems are being manufactured and/or undergoing shipboard integration for major At-Sea Demonstrations that are scheduled to occur in FY 2009. Additionally, funding growth is required for fabrication of large scale test articles, to support FY 2009 at-sea and land-based technology demonstrations. The reduction between FY 2009 and FY 2010 is due to the completion of the following FNC programs: small to large vessel at sea transfer, high speed seabase to shore connector, high rate horizontal to vertical movement. The transition opportunity for the Axial Flow Waterjet FNC Program has been changed from the Joint High Speed Ship to the Littoral Combat Ship (LCS), a new Technology Transition Agreement (TTA) has been signed. This FNC program is in Phase II where large-scale prototype waterjets will be designed and fabricated for demonstration on the LCS.

FY 2008 Accomplishments:
- Continued work for a beachable high speed craft as a Sea Base mobility interface.
- Continued efforts on the Large to Large Vessel Lift on/Lift off capability.
- Continued technology exploration in hydrodynamic impacts and design space trade studies.
- Continued efforts on the High Speed Sea Base to Shore Connector technology development.
- Continued efforts to develop technologies for Small to Large At-Sea Vessel Interfaces.
- Continued the development of concepts for High Rate Horizontal and Vertical Material Movement within the Sea Base.
- Continued efforts to develop a large scale Axial Flow Waterjet technology with the new transition target to Littoral Combat Ship (LCS).
- Continued efforts to develop blade control technology for the heavy lift vertical air replacement platform.

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B. Accomplishments/Planned Program ($ in Millions)		**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
FY 2009 Plans: - Continue all efforts of FY 2008. - Complete efforts on the High Speed Sea Base to Shore Connector technology development through at-sea demonstrations of the technologies. *FY 2010 Plans:* - Continue all efforts of FY 2009, less those noted as completed above. - Complete efforts for Small-to-Large Vessel At-Sea Transfer development via an at-sea demonstration of the technology. - Complete efforts for High Rate Vertical / Horizontal Material Mover development via a large-scale demonstration of the technology. - Initiate efforts to develop large ship fuel savings technologies for high speed materiel transport ships and follow on efforts initiated under Friction Drag Reduction refocused to other FNC efforts.					
SEA BASE PLANNING, OPERATIONS AND LOGISTICS This activity includes support for Sea Base Integrated Operations; Surface Connector Vehicle Transfer; Automated Weapons Assembly; and Sense and Respond Logistics. Sea Basing will require more robust afloat command and control for sustainment activities. Logistics must integrate with the joint task force common operating picture, and provide awareness of mission supportability and readiness at an operational and tactical level. This activity will produce techniques and systems to support automated transfer of cargo from shipboard unload/onload point to stowage spaces. This activity further supports the Seabasing mission of marshalling troops, equipment, and materials. It will improve current replenishment capabilities for transfer of cargo between Sea Base/Logistics vessels (large ship-to-ship) during high sea states, while maintaining safety of operations. Technologies include optical recognition, advanced robotics for weapons assembly, integrated data architectures, high-strength composites, wear-resistant coatings, environmental sensing, ship-motion compensation for force control-based systems, intelligent systems, and robotics.		19.546	19.192	19.528	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
FY 2008 - FY 2010 funding profile reflects planned project transitions through land-based and at-sea demonstrations and also the effects of the realignment of FNC Program investments into Enabling Capabilities (ECs). *FY 2008 Accomplishments:* - Continued efforts on the Large to Large Vessel Lift on/Lift off capability. - Continued efforts in the development of Interface Ramp Technologies for seabasing. - Continued efforts in the development of Intra-Connector Material Handling cargo securing technologies. - Initiated efforts for the development of technologies supporting automated shipboard assembly of air-delivered weapons. - Initiated the development of advanced technologies to provide a Sense and Respond Logistics capability. *FY 2009 Plans:* - Continue all efforts of FY 2008. - Initiate efforts to develop Sense and Respond Logistics Information Architecture prototype. *FY 2010 Plans:* - Continue all efforts of FY 2009, less those noted as completed above. - Complete efforts for Intra-Connector Material Handling cargo securing technology development via an at-sea demonstration and transition to NAVSEA PMS 377. - Complete efforts on the Large to Large Vessel Interface Lift on/Lift off capability with post-test analyses and transition to NAVSEA PMS385. - Complete the down selection of the Sense and Respond Logistics Information Architecture. - Initiate efforts to demonstrate sensor based Sense and Respond Logistics advanced technologies. - Initiate procurement and testing of available microfiltration (MF), and ultrafiltration (UF), systems suitable for shipboard use. - Initiate investigation of seawater treatment strategies to optimize performance of MF/UF pretreatment approaches.				

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B. Accomplishments/Planned Program ($ in Millions)		**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
- Initiate procurement and testing of approaches to recover energy from pressurized reverse osmosis waste brine. - Initiate efforts to select optimal reverse osmosis membranes. - Initiate development of agent based decision support and logistics planning tools.					
SEA BASING This activity includes advancement of technologies to support the design and development of Sea Base Enabler Innovative Naval Prototypes (INP's). Areas include design and development of various Sea Basing prototypes in the areas of high speed, shallow draft and beachable connectors; and vessel to vessel interfaces. The Sea Base Enabler INP effort was initiated in FY 2006. The INP program spans from conceptual design through prototype fabrication and testing. The increase between FY 2008 and FY 2009 represents changes in complexity and cost going from preliminary design and model development through prototype fabrication. This INP plan includes the completion of the development and at-sea testing of the Rapid Deployable Seabasing Stable Transfer Platform demonstrator; the continuation of several land based and tow-tank based model construction and testing for the Sea Base to “Over-the-Shore” Connector Transformational Craft (T-CRAFT) Prototype; and the full scale component-level development, evaluation, and testing of critical T-CRAFT technologies. The decrease in funding from FY 2009 to FY 2010 results from completion of test and evaluation of T-CRAFT model and down-selection. *FY 2008 Accomplishments:* - Continued multiple INP contracts for preliminary designs in the area of a T-CRAFT and a Rapidly Deployable Seabasing Stable Transfer Platform. - Continued the down-selection of T-CRAFT designs for further development and model construction and testing. - Continued T-CRAFT model construction and testing. - Continued a second evaluation of potential new Seabasing INP efforts. - Completed the development of the Rapidly Deployable Seabasing Stable Transfer Platform demonstrator.		12.051	26.154	13.825	

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B. Accomplishments/Planned Program ($ in Millions)		**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
- Initiated planning of T-CRAFT prototype and component development. *FY 2009 Plans:* - Continue all efforts of FY 2008 less those noted as completed above. - Complete T-CRAFT model testing and evaluation. - Initiate the down-selection of T-CRAFT designs for prototype and component development. - Initiate testing and evaluation of E-CRAFT demonstrator hydrodynamic and structural characteristics. - Above Threshold Reprogramming (ATR) for RATTLRS for $18.789 was approved March 2009 to transfer to Program Element 0603114N (not reflected in current funding profile). *FY 2010 Plans:* - Continue all efforts of FY 2009. - Complete the down-selection of T-CRAFT designs for prototype and component development. - Complete testing and evaluation of E-CRAFT demonstrator hydrodynamic and structural characteristics. - Initiate contract design and develop shipyard building plans for T-CRAFT prototype and component construction. - Initiate procurement of components and material to support T-CRAFT prototype construction.					
TRAINING SYSTEMS This activity improves mission effectiveness and safety by applying both simulation and instructional technology to the design of affordable education and training methods and systems. Improved training efficiency and cost-effectiveness is achieved by applying operations research, modeling and simulation, and instructional, cognitive, and computer sciences to the logistics, development, delivery, evaluation, and execution of training. The decrease in funding from FY 2009 to FY 2010 results from completion of research to enhanced human performance in networked environments. *FY 2008 Accomplishments:* - Initiated research and assessment of advanced gaming technology for enhanced training.		9.749	10.737	8.790	

Exhibit R-2a, PB 2010 Navy RDT&E Project Justification		DATE: May 2009			
APPROPRIATION/BUDGET ACTIVITY 1319 - Research, Development, Test & Evaluation, Navy/BA 3 - Advanced Technology Development (ATD)	R-1 ITEM NOMENCLATURE PE 0603236N WARFIGHTER SUSTAINMENT ADVANCED TECHNOLOGY			PROJECT NUMBER 2915	
B. Accomplishments/Planned Program ($ in Millions)		**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
- Initiated development and demonstration of technology for enhanced human performance in networked environments. - Initiated developments for enabling better warfighter understanding of languages and cultures to enhance their regional expertise. *FY 2009 Plans:* - Continue all efforts of FY 2008. - Initiate advanced technology development demonstrations of game based training for better warfighter understanding of languages and cultures to enhance their regional expertise. - Initiate experiments to validate automated performance assessment and after action reviews. - Initiate development of an Adaptive Expert System to automatically and rapidly analyze aircrew performance (1M+ flight hours annually) to detect human factors related mishap leading indicators using a new technique with anomaly and corroboration. *FY 2010 Plans:* - Continue all efforts of FY 2009. - Complete development and demonstration of technology for enhanced human performance in networked environments. - Initiate development of validated, effective, adaptive training system components to enhance individual and team training for submarine navigation and piloting skills and for surface ship Combat Information Center training.					
TURBINE ENGINE TECHNOLOGY This activity provides integration and experimental engine testing of advanced gas turbine engine technologies to reduce their technical risk and demonstrate their readiness for transition. These technologies will enable advanced capabilities for Navy weapon systems at reduced total ownership costs. Versatile Affordable Advanced Turbine Engines (VAATE) is a DoD/DOE/NASA/Industry program to develop and demonstrate versatile, affordable, advanced engine technologies enabling for increased systems capabilities and reduced total ownership costs. The VAATE goal is 10X improvement in propulsion system affordability (capability/cost) by 2017, with interim goals of 4X by 2009 and 6X by		6.775	11.633	10.635	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
2013. The elements of the capability-to-cost index are increased thrust to weight; decreased specific fuel consumption; and reduced development, production, and maintenance costs for the entire integrated propulsion system. To achieve these goals, VAATE is organized into multiple product areas. Specifically for the Navy, the focus, as part of the Enterprise and Platform Enablers FNC, is on turbine engine capability enhancements for future and emerging systems. Technologies critical to Navy fighter jets are being worked, including low pressure turbine technologies for short takeoff and landing; high pressure turbine technologies for higher temperature, longer life; fan and compressor technologies for greater engine robustness and durability, and instrumentation and control technologies for greater engine state awareness and less unscheduled maintenance. Technologies being demonstrated include advanced aerodynamic, material, and structural concepts and emerging active control, prognostic health management, thermal management, aircraft subsystem integration, and information technologies. The increase in funding will support initiation of the design and fabrication of the VAATE II demonstrator engine with the General Electric (GE) / Liberty Works (LW) team that was delayed to FY 2009 and also the initiation of VAATE II demonstrator engine planning with Pratt and Whitney (P&W). *FY 2008 Accomplishments:* - Continued VAATE Phase I: Design, component development, integration and fabrication of Phase I demonstrator engines. - Completed initial testing of VAATE Phase I demonstrator and core engines with General Electric (GE)/ Liberty Works (LW) and Pratt & Whitney (P&W). - Initiated development of shipboard compact power conversion technologies for multi-function motor drives, bi-directional power conversion modules, and power management controllers. - Initiated design and fabrication of VAATE Phase II demonstrator engines with GE/LW and P&W. (Impact of Congressional reduction: Design and fabrication of VAATE Phase II demonstrator engines with GE/LW has been delayed until FY 2009.) *FY 2009 Plans:* - Continue all efforts of FY 2008 less those noted as completed above.				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
- Complete reporting shipboard compact power conversion project under this Program Element (PE). These efforts transition to PE 0603123N Force Protection Advanced Technology, R2 Activity Surface Ship & Submarine Hull Mechanical and Electrical (HM&E) in FY 2009. - Complete testing of VAATE Phase I demonstrator engines with GE/LW and P&W. - Initiate component design and development for a VAATE Phase II demonstrator engine with P&W. - Initiate planning of a VAATE Phase II demonstrator engine planning with GE/LW. *FY 2010 Plans:* - Continue all efforts of FY 2009 less those noted as completed above. - Complete testing of the final VAATE Phase I demonstrator engine. - Initiate component design and development for a VAATE Phase II demonstrator engine with GE/LW.				

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APPROPRIATION/BUDGET ACTIVITY 1319 - Research, Development, Test & Evaluation, Navy/BA 3 - Advanced Technology Development (ATD)	R-1 ITEM NOMENCLATURE PE 0603236N WARFIGHTER SUSTAINMENT ADVANCED TECHNOLOGY	PROJECT NUMBER 2915

C. Other Program Funding Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	Cost To Complete	Total Cost
PE 0206624M/Marine Corps Combat Services Support									Continuing	Continuing
PE 0601102A/Defense Research Sciences									Continuing	Continuing
PE 0601102F/Defense Research Sciences									Continuing	Continuing
PE 0601103N/University Research Initiatives									Continuing	Continuing
PE 0601152N/In-House Laboratory Independent Research									Continuing	Continuing
PE 0601153N/Defense Research Sciences									Continuing	Continuing
PE 0602123N/Force Protection Applied Research									Continuing	Continuing
PE 0602131M/Marine Corps Landing Force Technology									Continuing	Continuing
PE 0602203F/Aerospace Propulsion									Continuing	Continuing
PE 0602211A/Aviation Technology									Continuing	Continuing
PE 0602236N/Warfighter Sustainment Applied Research									Continuing	Continuing
									Continuing	Continuing

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PE 0603003A/Aviation Advanced Technology		
PE 0603007A/Manpower, Personnel and Training Advanced Technology	Continuing	Continuing
PE 0603216F/Aerospace Propulsion and Power Technology	Continuing	Continuing
PE 0603512N/Carrier Systems Development	Continuing	Continuing
PE 0603640M/USMC Advanced Technology Demonstration (ATD)	Continuing	Continuing
PE 0604703N/Personnel, Training, Simulation, and Human Factors	Continuing	Continuing
PE 0605013M/Information Technology Development	Continuing	Continuing
PE 0605152N/Studies and Analysis Support - Navy	Continuing	Continuing

D. Acquisition Strategy

Not applicable.

E. Performance Metrics

Efforts within this PE support the FNC program and are monitored at two levels. At the lowest level, each is measured against technical and financial milestones on a monthly basis. Annually, each FNC project is reviewed in depth for technical and transition performance by The Chief of Naval Research. Routine site visits to performing organizations are conducted to assess programmatic and technical progress. Most are reviewed annually or bi-annually by an independent board of visitors who assess the level and quality of the Science and Technology basis for the project.

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COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
9999: CONGRESSIONAL PLUS-UPS	10.348	25.291	0.000						Continuing	Continuing

A. Mission Description and Budget Item Justification

N/A

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

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